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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SANTIAGO, MARICELI	
ART UNIT	**PAPER NUMBER**
2879	

DATE MAILED: 07/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/627,355	MACKEY ET AL.
	Examiner	Art Unit
	Mariceli Santiago	2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10,12-18,36,37 and 39-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10,12-18,36,37 and 39-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

R spons to Amendment

The Amendment, filed on April 21, 2003, has been entered and acknowledged by the Examiner.

Cancellation of claims 11 and 38 has been entered.

New claims 45-51 have been entered and acknowledged by the Examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13 and 46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the limitation "said cathode structure" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 46 recites the limitation "said cathode" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10, 12-14, 16, 17, 36, 37, 39, 40, 42, 43, 45-48, 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al. (US 5,536,993) in view of Kawate et al. (US 5,770,918).

Regarding claims 10, 12-14, 16 and 17, Taylor discloses a protected cathode substrate structure of a field emission display device, the protected cathode substrate (60) comprising a cathode substrate (66) of a field emission display device, the cathode substrate (66) comprising an electron emitting structure (70) disposed above one side thereof, wherein the cathode substrate (66) comprises glass (Column 7, lines 23-25), and a substantially continuous barrier layer (64, Column 6, lines 45-54) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer having a thickness substantially of 50nm and comprising SiO_2 (Column 7, lines 23-25).

Taylor is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

In regards of the limitation in claim 10, wherein the barrier layer prevents electron bombardment by electrons originating from the electron emitting structure, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer disclosed by Taylor intrinsically prevents electron bombardment as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 12, wherein the barrier layer comprising a substantially transparent, electron-damage resistant material, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer disclosed by Taylor intrinsically is a substantially transparent, electron-damage resistant material as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 13, wherein the barrier layer has a thickness sufficient to prevent substantial penetration of the electrons through the barrier layer such that the electrons do not impinge the cathode structure, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer thickness disclosed by Taylor intrinsically prevents penetration of electrons as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 16, wherein the barrier layer prevents the migration of contaminants from the cathode substrate into the field emission display device, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer thickness disclosed by Taylor intrinsically prevents migration of contaminants as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 17, wherein the barrier layer prevents the migration of sodium from the cathode substrate into the field emission display device, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer thickness disclosed by Taylor intrinsically prevents migration of sodium as evidenced by Taylor's disclosure of all the claimed structural limitations.

Regarding claims 36, 37, 39, 40, 42 and 43, Taylor discloses a method for protecting a cathode structure of a field emission display device (61), the method comprising the step of providing a cathode structure of a field emission display device, the cathode structure

comprising an electron emitting structure (70) above one side thereof and a cathode substrate (66) of the field emission display device, wherein the cathode substrate comprises glass (Column 7, lines 23-25), and disposing a substantially continuous barrier layer (64) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer having a thickness substantially of 50nm and comprising SiO_2 (Column 7, lines 23-25).

Taylor is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

In regards of the limitation in claim 36, wherein the barrier layer prevents penetration by electrons, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents penetration by electrons as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 39, wherein the barrier layer has a thickness sufficient to prevent substantial penetration of the electrons therethrough, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents penetration of electrons as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 42, wherein the barrier layer prevents the migration of contaminants from the cathode structure into the field emission display device, Taylor discloses

a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents migration of contaminants as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 43, wherein the barrier layer prevents the migration of sodium from the cathode structure into the field emission display device, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents migration of sodium as evidenced by Taylor's disclosure of all the claimed structural limitations.

Regarding claims 45, 46, 47, 48, 50 and 51, Taylor discloses a protected cathode substrate structure of a field emission display device, the protected cathode substrate (66) comprising a cathode substrate of a field emission display device, the cathode substrate (66) comprising an electron emitting structure (70) disposed above one side thereof, wherein the cathode substrate comprises glass (Column 7, lines 27-29), and a substantially continuous barrier layer (64) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer having a thickness substantially of 50 nm and comprising SiO_2 (Column 7, lines 27-29).

Taylor is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

In regards of the limitation in claim 45, wherein the barrier layer prevents electron bombardment by electrons originating from the electron emitting structure, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents electron bombardment as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 47, wherein the barrier layer comprising a substantially transparent, electron-damage resistant material, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically is a substantially transparent, electron-damage resistant material as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 48, wherein the barrier layer has a thickness sufficient to prevent substantial penetration of the electrons through the barrier layer such that the electrons do not impinge the cathode structure, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents penetration of electrons as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 50, wherein the barrier layer prevents the migration of contaminants from the cathode substrate into the field emission display device, Taylor discloses a silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents migration of contaminants as evidenced by Taylor's disclosure of all the claimed structural limitations.

In regards of the limitation in claim 51, wherein the barrier layer prevents the migration of sodium from the cathode substrate into the field emission display device, Taylor discloses a

silicon dioxide barrier layer having a thickness of 50nm, it is the Examiner's position that the barrier layer material and thickness disclosed by Taylor intrinsically prevents migration of sodium as evidenced by Taylor's disclosure of all the claimed structural limitations.

Claims 10, 15, 36, 41, 45 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borel et al. (US 4,857,161) in view of Kawate et al. (US 5,770,918).

Regarding claims 10 and 15, Borel discloses a protected cathode substrate structure of a field emission display device, the protected cathode substrate comprising a cathode substrate of a field emission display device, the cathode substrate (6) comprising an electron emitting structure (8) disposed above one side thereof, wherein the cathode substrate comprises glass (Column 4, lines 1-8), and a substantially continuous barrier layer (7) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer (7) having a thickness substantially of 100 nm and comprising silicon dioxide (Column 4, lines 1-8).

Borel is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

Regarding claims 36 and 41, Borel discloses a method for protecting a cathode structure of a field emission display device, the method comprising the step of providing a cathode structure of a field emission display device, the cathode structure comprising an electron emitting structure above one side thereof and a cathode substrate (6) of the field emission

display device, wherein the cathode structure comprises glass (Column 4, lines 1-8), and disposing a substantially continuous barrier layer (7) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer having a thickness substantially of 100 nm and comprising silicon dioxide (Column 4, lines 1-8).

Borel is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

Regarding claims 45 and 49, Borel discloses a protected cathode substrate structure of a field emission display device, the protected cathode substrate comprising a cathode substrate (6) of a field emission display device, the cathode substrate (6) comprising an electron emitting structure disposed above one side thereof, wherein the cathode substrate comprises glass (Column 4, lines 1-8), and a substantially continuous barrier layer (7) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer having a thickness substantially of 100 nm and comprising silicon dioxide (Column 4, lines 1-8).

Borel is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as

an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

Claims 10, 18, 36 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamoto et al. (US 5,847,496) in view of Kawate et al. (US 5,770,918).

Regarding claims 10 and 18, Nakamoto discloses a protected cathode substrate structure of a field emission display device, the protected cathode substrate (19) comprising a cathode substrate of a field emission display device, the cathode substrate comprising an electron emitting structure (20) disposed above one side thereof, wherein the cathode substrate comprises glass (Column 4, lines 57-62), and a substantially continuous barrier layer (17) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer (17) having a thickness substantially of 1μ nm and comprising an electrically conductive material (e.g. ITO and aluminum; Column 4, lines 51-56).

Nakamoto is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

Regarding claims 36 and 44, Nakamoto discloses a method for protecting a cathode structure of a field emission display device, the method comprising the step of providing a cathode structure of a field emission display device, the cathode structure comprising an

electron emitting structure (20) above one side thereof and a cathode substrate (19) of the field emission display device, wherein the cathode structure comprises glass (Column 4, lines 57-62), and disposing a substantially continuous barrier layer (17) of substantially uniform thickness disposed over the one side of the cathode substrate, the barrier layer (17) having a thickness substantially of 1μ nm and comprising an electrically conductive material (e.g. ITO and aluminum; Column 4, lines 51-56).

Nakamoto is silent in respect to the type of glass used for the cathode substrate, specifically high-sodium glass. However, in the same field of endeavor, Kawate discloses several types of glass generally used in cathode substrates for display devices, inclusive soda-lime glass (Column 7, lines 27-29), which is well known for its high-sodium contents. One of ordinary skills in the art would consider the use of soda-lime glass for the material of the cathode substrate as an obvious matter of design choice, since the selection of a known material on the basis of its suitability for the intended use would be considered within the level of skills in the art.

Response to Arguments

Applicant's arguments filed April 21, 2003 have been fully considered but they are not persuasive.

In regards to applicants arguments that the cited prior art, Taylor et al. (US 5,536,993), fails to teach or suggest a barrier layer which prevents electron bombardment, the Examiner respectfully disagree. Applicant argues that Taylor discloses a SiO_2 layer of approximately 50nm and it is the Applicant's position that the disclosed thickness is not sufficient to prevent substantial penetration of electron. However, Applicant's specification states a thickness of the barrier layer being approximately 50-500 nm, furthermore, it is stated that the invention is well

suited to varying the total thickness of the layer greater than or less than the thickness range listed above (Page 19, lines 2-9 and inclusive Page 36, lines 23-26). Accordingly, the barrier layer disclosed by Taylor having a thickness of 50nm complies with the thickness requirement disclosed by the Applicant and therefore is intrinsically capable of preventing electron bombardment as evidenced by Taylor's disclosure of all the claimed structural limitations.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mariceli Santiago whose telephone number is (703) 305-1083. The examiner can normally be reached on Monday-Friday from 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382. Additionally, the following fax phone numbers can be used during the prosecution of this application (703) 872-9318 (for response before a Final Action) and (703) 872-9319 (for response after a Final Action).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

MStgo 6/19/03
Mariceli Santiago
Patent Examiner
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